
A 'Water Walkers' Exercise Program for the Elderly

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Their proposal won third prize in the 1991 Secretary's Award for Innovations in Health Promotion and Disease Prevention competition. The contest is sponsored by the Department of Health and Human Services and administered by the Health Resources and Services Administration of the Public Health Service in cooperation with the Federation of Associations of Schools of the Health Professions. The entry was submitted by the Idaho State University School of Pharmacy.

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Synopsis

Recent studies have shown that older people, stereotyped as weak, frail, and inactive, demonstrate an equal capacity to reap the physical and psychological benefits of recreational exercise.

A low cost aquatic exercise program is proposed that is geared towards those persons who, because of their physical limitations, are unable to partici-

pate in the more traditional walking or low-impact aerobics programs currently available for seniors. A water-based program would allow these people to gain all the advantages of land-based exercise with out stress or strain on arthritic joints. In addition, the use of water walkers (a buoyancy device which attaches easily around the waist) would allow total freedom of movement without fear of deep water. Those with various levels of disability could, therefore, participate at their own pace.

Two programs, including transportation, would be provided twice a week for 8 weeks each. An individual 45-minute session would consist of a warm-up period with gentle stretching, a cardiovascular segment, a cool-down period, strength-training, and a final stretching time. All exercises would be conducted with participants wearing the water walkers, allowing total immersion to the shoulder. Free to move about the pool, they would be encouraged to interact socially with one another.

The results of the program would be determined by measuring range of motion, cardiovascular endurance, and strength before and after each 8-week session. Participants' level of self confidence and life satisfaction will be estimated and any psychological improvement will be documented.

OLD AGE IS A TIME characterized by loss—loss of family and friends, work-identity, and independence. Isolation and diminishing physical capabilities contribute significantly to feelings of helplessness and lack of control. In fact, reactive depression may be the most common illness of the elderly (1).

In the past few years, however, the stereotype of frail, inactive older persons has been open to question. The current interest in health, wellness, and the benefits of exercise has expanded to include both the very young and the very old. Recent studies have demonstrated that the benefits of an active lifestyle do not diminish at age 65. In fact, the physical and psychological aspects of aging make participation in an organized exercise program very beneficial, both as a physical challenge and as a social outlet for the elderly.

Traditional low-impact and chair aerobics programs geared for seniors, such as Idaho State University's Senior Enhancing Lifelong Fitness program, have been very successful. They are tailored to and tend to attract, however, those seniors who are already fairly active, outgoing, and independent.

We propose the creation of a gentle aquatic exercise program tailored to the less able seniors in the community who are either homebound or in assisted-living environments. Transportation to and from the program would be provided twice a week for two 8-week sessions at no charge to the participants. Additionally, the program would provide "water walkers," a foam flotation device that is attached around the waist, allowing total immersion in the water up to shoulder level. Thus, nonswimmers and those persons fearful of deep

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water would be able to stay buoyant with no effort on their part. Participants will have full range of motion with no joint strain while receiving maximum benefit from the warm water.

Literature Summary

Exercise has many advantages that are particularly important to older people. Research has demonstrated both the conditioning and rehabilitative effectiveness of physical activity for elderly men and women (2-4). Vigorous physical activity, especially if it is recreational, has been shown to be a strong promoter of longevity (5,6). There is indisputable evidence that cardiovascular fitness is enhanced by exercise. At a given level of exertion, physical training results in decreased oxygen requirements of the heart as well as decreased peripheral resistance and blood pressure (7-9). This is crucial for those suffering from hypertension, coronary heart disease, or angina pectoris. Lipid and carbohydrate metabolism is altered as well, resulting in a blood lipid and lipoprotein profile consistent with a decreased risk of atherosclerosis (10).

On average, muscle mass declines by 30 percent between the ages of 30 and 70 (5). Regular exercise increases muscle mass and maintains muscular strength, both of which are essential in the prevention and rehabilitation of many musculoskeletal problems commonly found in the geriatric population (8,11). Although all motor nerves and muscle fibers atrophy with age, type I (slow twitch) motor units are the last to degenerate (5). The type of exercise that enhances type I units is repetitive, low resistance, continuous movement (5).

Osteoporosis, the loss of mineral bone mass, causes approximately 700,000 fractures per year, one-third of which occur in the hip joint (5). Physical activity may prevent or delay the onset of osteoporosis both by stimulating the microcirculation in bone and by promoting bone deposition (5).

Moderate exercise training has also been associated with a 20-percent increase in serum immunoglobulins (12). Any enhancement of the immune system would be of great importance to the elderly population because the susceptibility to and seriousness of infections increase dramatically with age (13).

Aquatic exercise has been shown to have similar cardiovascular and musculoskeletal benefits for older people as "on the ground" aerobic exercise previously discussed (14). Beyond that, exercising in water with water walkers has specific advantages for the elderly. Arthritis, a common affliction of the older person, is characterized by joint pain, stiffness, tenderness, and immobility. The American College of Sports Medicine has stated that aerobic activity involving large muscle groups with an emphasis on joint range of motion is indicated for the arthritic elderly (5). There is an increasing body of evidence that aquatherapy increases fitness and mobility in patients with rheumatoid arthritis without exacerbating their symptoms (11,15,16). The use of water walkers to increase buoyancy would allow arthritic persons to gain the full benefits of aerobic exercise with no strain or pressure on tender joints. Warm water has particularly soothing and salubrious effects on those suffering from arthritis.

A further benefit of water-based exercising is that swimming is known to cause less exercise-induced asthma than other forms of exertion (17). It is believed that the humid air is protective for asthmatic exercisers (18).

Water can be a great equalizer. People with various levels of ability and disability can participate at their own pace. Problems that would make land-based exercise difficult or impossible are less apparent in the water.

In addition to the physiological benefits of exercise, there is mounting evidence that there are significant psychological advantages as well. Subjects participating in regular aerobic training have reported feelings of increased well-being and decreased incidence of stress and depression (9,19). Studies on older aerobics participants consistently describe significant improvements in self-confidence, social life, sleep patterns, and sex life associated with moderate regular activity (14,20,21). Improvements in the cognitive functioning of older adults from exercise also have been shown (22,23).

The support of a spouse or a friend is extremely important in encouraging participation in exercise programs (24,25). Participants in the program we

describe will be free to move about the pool with their water walkers and will have frequent opportunities to interact socially with one other. Also, the design of the fee system (half price for two people signing up together) encourages a "buddy system" from the outset.

Project Objectives

The primary objective of this project is to demonstrate that a water-based exercise program designed for relatively isolated, less-able senior citizens is both plausible and efficacious. The innovative use of water walkers as a buoyancy device and the provision of transportation will make the program accessible to those unable to use walking or the more traditional exercise programs currently available for seniors in the community.

Secondary objectives include the collection of data to quantify the physiological and psychological benefits of an aquatic program for inactive, older adults for whom traditional exercise programs are inaccessible. We hope to demonstrate significant increases in strength, trunk and hamstring flexibility, cardiovascular endurance, life satisfaction, and self confidence at the end of the 8-week session.

Methodology

Participants will be recruited from assisted-living programs in Pocatello, ID. Advertisements will be posted in community areas and announcements made during congregate meal times. It will be announced that the charge for one 8-week session is \$10 per person, but if any two people sign up together, the charge will be \$10 for both. This should promote the development of a support system for all participants right from the beginning. Class size will be limited to 15 persons so that each person may be monitored carefully while exercising. Written clearance will be required from each participant's personal physician for them to participate. Total cost of the program has been estimated at slightly more than \$750 (see table).

Classes will be held twice weekly at Idaho State University's Reed Gymnasium swimming pool. The exercise class itself will consist of adapted aquatics and calisthenics movements requiring little skill or coordination. Water walkers will be attached around the participants' waists to allow complete buoyancy in the water. For those with difficulty climbing down the ladder into the pool, there is a motorized chair available to lower them gently into

Budget for water walker exercise program for the elderly

Personnel:	
Instructor (CPR and IDEA-certified) @ \$8 per class	\$256.00
Minivan driver-assistant @ \$5.50 per hour ..	352.00
Administrative overhead @ \$6 per hour	72.00
Equipment: ¹	
15 Water Walkers (floatation devices)	101.21
Music tapes	16.00
Advertising:	
Newspapers	84.00
Flyers	24.50
Xeroxing of medical approval forms	4.00
Total	\$909.71
Income from 30 persons @ \$10 for every 2 persons	150.00
Net cost	\$759.71

¹ The swimming pool and tape players will be supplied by Idaho State University.

NOTE: CPR = Cardiopulmonary resuscitation; IDEA = International Dance Exercise Association.

the water. Heart rates will be checked every 5 minutes to ensure that no person's exceeds 120 beats per minute. The movements will be performed to the beat of swing-era music (110-130 beats per minute). The first 5 minutes will consist of a general warm-up period with slow deep-water jogging, followed by 10 minutes of gentle stretching at the side of the pool. The next 15 minutes will consist of large, calisthenic-like movements where the target heart rate range will be 100-120 beats per minute. The remaining 15 minutes will be spent in the shallow end of the pool, slowly cooling down, working muscle groups essential for daily activities, and gently stretching.

Significance of the Project

Heart disease is the leading cause of death in this country, accounting for 44 percent of all deaths among the elderly in 1978 (13). Researchers at the Centers for Disease Control give a sedentary lifestyle the same overall weight as a major risk factor for coronary artery disease as cigarette smoking. Exercise does not need to be of high intensity to be beneficial. The total amount of activity is more important for health than higher intensities. Even in the presence of existing cardiovascular disease, regular physical activity is beneficial if prudent guidelines are followed (26).

Anaerobic exercises such as weight lifting are contraindicated in the elderly because of the increased afterload placed on the heart and resultant danger of cerebrovascular accidents (8,27). The resistance and buoyancy allowed by aquatic exer-

cise, on the other hand, provides all the aerobic and flexibility benefits while minimizing movement and weight-bearing stress on muscles and joints (28).

The 1980 U.S. Census reported that 25 million Americans ages 65 and older constituted 11.3 percent of the population. By the year 2035, it is estimated that those ages 65 or older will amount to more than 20 percent of the population (29). Studies of the elderly have revealed that those engaged in regular physical activity maintain a higher level of functional capacity and do not experience the typical declines in later years (30,31). Thus, programs that foster a sense of personal control and responsibility for health maintenance and disease prevention in the elderly can have a great impact in the future.

Summary of Evaluation Methods

The first class will be devoted to determining baseline indices of the blood pressure, flexibility, functional strength, and cardiovascular endurance of the participants. Hamstring flexibility will be assessed by measuring the degree of straight leg flexion from a supine position with a protractor. Trunk flexibility will be determined using the sit-and-reach test. Strength will be measured using the test in which subjects stand upright from a seated position as many times as possible within a 30-second time span. Cardiovascular endurance will be assessed by asking participants to rate their perceived exertion rate between 0 (very light) to 10 (very hard) after 2 minutes of performing a jogging movement in the pool with the water walker to music at 120 beats per minute. Resting heart rate will not be used to assess fitness level, since many of the participants will be taking beta blockers or other antihypertensive medications that would confound the results. An assessment of life satisfaction and self-confidence will be made using the Profile of Mood States self-report instrument. Both physiological and psychological measures will be repeated at the end of the 8-week session.

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ABSTRACTS OF SEMIFINALISTS' PAPERS

A Program of Parental and Group Mental Health After Care for Adolescents

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Many communities lack treatment and support groups for adolescents on an outpatient basis after their hospitalization for a serious and common affective disorder, such as depression. Parents of such adolescents also need a strong support system, along with education that is specific to the needs of the family.

Adolescents who have been hospitalized for psychiatric disorders generally agree that their most helpful experiences in the hospital had been gained through group therapy sessions. They tend to miss the safe, structured, and supportive atmosphere of group therapy and to feel as if they need to return to the hospital when problems arise. Parents often see a need for continued care to assist the family in the period of adjustment when the adolescent becomes an outpatient.

Much current literature speaks of a positive correlation between the use of groups to provide support and therapy for adolescents and the adolescents' increased social skills. Frequently deficits in social skills are associated with some degree of social isolation in the depressed adolescent. One study postulates that when depressed adolescents perform poorly socially, this per-

formance reinforces the adolescent's negative self-perceptions, continuing the cycle. Problem solving skills have been found to be lacking among depressed adolescents, and low self-esteem seems to follow when an adolescent is not performing well socially.

Many adolescents are hospitalized after suicide attempts, but few who attempt suicide are inpatients at the time. Hospital admissions of adolescents have been increasing in the past few years, with more than 80,000 persons younger than 18 years admitted to inpatient psychiatric facilities in 1980. Group therapy has been shown to be a successful treatment for depression. Groups are the main method of treatment in most inpatient psychiatric settings and are viewed as the treatment of choice in adolescents.

The major objective of this proposal is to provide group support to the depressed adolescent to decrease re-hospitalizations, decrease suicide rates, and increase the social, problem solving, and cognitive skills of the adolescent. The second objective is to provide support and education for the parents of depressed adolescents. This effort should help guide the parents in working with their child to achieve better mental health. A long-term goal is to help these young persons become contributing members of society. All these efforts should, in turn, increase knowledge of affective disorders and decrease the stigma of mental disorders.

Groups in this study would be composed of adolescents with affective disorders; groups of patients with schizophrenia or personality disorders have not been shown to be highly successful. At least three groups would be studied, each at a different facility to see if results are replicated. A control group of adolescents with similar problems would not receive after care. Adolescents would be randomly selected for both the control and the experimental groups. The parents of those in the experimental group would participate in a group as well. A parallel parent group would increase compliance of adolescents to attend. All subjects would sign informed consent forms.

The groups would meet once weekly for a minimum of 3 months. The optimum number of participants in each group is seven to eight. The study groups would be closed in order to obtain proper statistical information. If the study is successful, subsequent groups may be open to newly discharged outpatients to enhance peer learning.

The adolescent groups would focus on improving social skills, problem-solving skills, and negative cognition, and would use specific activities to achieve these goals. Group activities in themselves may help with each of these. Structured role assignments during meetings, homework assignments using negotiation, communication, or handling conflicts, and per-